DOCUMENT RESUME

ED 213 841 CE 031 464

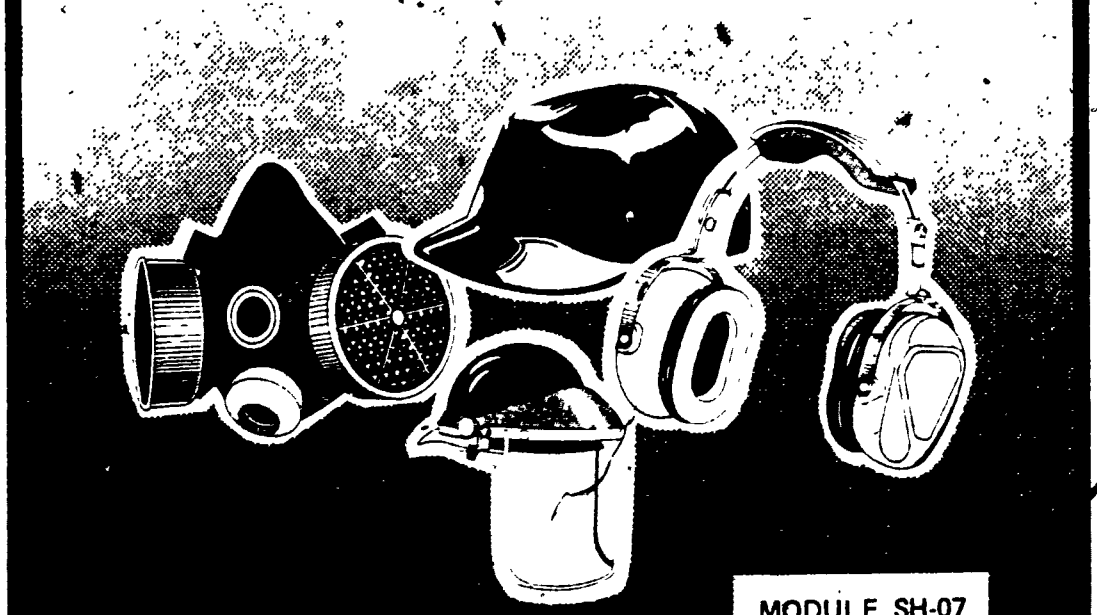
TITLE	Safety Signs, Tags, and Color Codes. Module SH-07. Safety and Health.
INSTITUTION	Center for Occupational Research and Development, Inc., Waco, Tex.
SPONS AGENCY	Office of Vocational and Adult Education (ED). Washington, DC. Div. of National Vocational Programs.
PUB DATE	81
CONTRACT	300-79-0709
NOTE	24p.; For related documents see CE 031 450-507.
AVAILABLE FROM	The Center for Occupational Research and Development, 601 Lake Air Dr., Suite C; Waco, TX 76710 (Instructor Guides, $9.75 each; Learning Modules, $3.00 each. Entire set of Learning Modules available as two subsets: SH-21, SH-41, SH-43, SH-45, and SH-48, $12.00; remaining 45 modules, $97.50).
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Behavioral Objectives; *Health Education; *Learning Activities; Learning Modules; Postsecondary Education; *Safety Education; *Safety Equipment; Secondary Education; *Signs; *Vocational Education
IDENTIFIERS	*Occupational Safety and Health

ABSTRACT

This student module on safety signs, tags, and color codes is one of 50 modules concerned with job safety and health. This module discusses the design and use of safety signs, labels, and tags, and the standards that exist to ensure their uniform appearance. Following the introduction, six objectives (each keyed to a page in the text) the student is expected to accomplish are listed (e.g., Identify the meanings and uses of various safety colors). Then each objective is taught in detail, sometimes accompanied by illustrations. Learning activities are included. A list of references and answers to learning activities complete the module. (CT)

SAFETY AND HEALTH

SAFETY SIGNS, TAGS, AND COLOR CODES



MODULE SH-07

ORD

CENTER FOR OCCUPATIONAL RESEARCH AND DEVELOPMENT

DISCRIMINATION PROHIBITED – No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance, or be so treated on the basis of sex under most education programs or activities receiving Federal assistance.

The activity which is the subject of this document was supported in whole or in part by the U. S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the Department of Education, and no official endorsement by the Department of Education should be inferred.

This work was developed under contract number 300790709 for the U. S. Department of Education, Office of Vocational and Adult Education.

The Center for Occupational Research and Development
601 Lake Air Drive, Suite C
Waco, Texas 76710

INTRODUCTION

Signs, labels, and tags warning of danger are among the oldest items of safety equipment. Lives, limbs, and property have been saved because of signs telling workers to "Keep Hands Free of Moving Machinery," "Watch Out for Trucks," or "Do Not Smoke — Flammable Liquids Stored in This Area."

Since it is often impossible to organize a workplace so that no hazards exist, employers use signs, labels, and tags to warn employers of existing or possible hazards. Familiar legends (words), symbols, and colors instantly alert workers to the hazards and prompt them to take extra care to avoid injury.

This module discusses the design and use of safety signs, labels, and tags, and the standards that exist to ensure their uniform appearance.

OBJECTIVES

Upon completion of this module, the student should be able to:

1. Identify the meanings and uses of various safety colors. (Page 3)
2. Describe the purpose, colors used, and any other specific requirements for the following signs: (Page 4)
   a. Danger.
   b. Caution.
   c. Exit.
   d. Safety instructional.
   e. Directional.
   f. Slow-moving vehicle.
   g. Biological hazard.
   h. Radiation hazard.
   i. Chemical hazard.
   j. Traffic.
3. Briefly define accident prevention tags and how they are used. (Page 9)
4. Identify the color, use, and specifications of the following accident prevention tags: (Page 10)

a. Danger.
b. Caution.
c. Out of Order (Do Not Use).
d. Do Not Operate.

5. Summarize the requirements for labels, markings, and signs that apply to toxic and hazardous substances. (Page 12)

6. Given a sign, marking, or label, identify which of the following it is designed for: (Page 16)
   a. Compressed gas cylinder.
   b. Fire extinguisher.
   c. Liquefied petroleum.
   d. Load ratings (cranes, derricks, and powered industrial trucks).
   e. Aisles.

SUBJECT MATTER

OBJECTIVE 1: Identify the meanings and uses of the various safety colors.

The purpose of accident prevention signs is to warn of hazards and to prompt a suitable response to those hazards. Since people usually react more quickly to signs that are familiar, standards have been set up to regulate the design and color of safety signs.

The American National Standards Institute (ANSI) has established color standards, in ANSI Z53.1-1979, which identify the exact shade that may be called safety yellow, safety purple, and so on. The standards also fix general meanings for each color. The following is a listing of the colors and their meanings.

Safety Red means three things: fire protection equipment, danger, and stop —

- Fire protection equipment is painted or marked with red; this includes alarm pulls, fire blanket boxes, fire buckets, fire exit signs, fire sirens, and sprinkler pipes.
- Danger signs in red are placed on safety cans for flammable (easy to set on fire) liquids.
- Stop in red is used for emergency stop bars, stop buttons and switches.

Safety Orange marks dangerous parts of machinery or power equipment that may cut, crush, shock, or otherwise injure.

Safety Yellow means caution. It is used to mark stumbling, tripping, or falling hazards, and is often striped or checkered with black to attract attention more quickly. Yellow is also used for storage cabinets and containers for flammable materials, explosives, corrosives, or unstable materials.

Safety Black on Safety Yellow is the new marker for radiation hazards, taking the place of Safety Purple.

Safety Green marks the location of first aid and safety equipment.

Safety Blue marks information given on signs and bulletin boards (not of a safety nature). Safety Blue also has special uses in railroad areas to warn against the starting, use of, or movement of equipment that is under repair or being worked upon.

Safety Black, Safety White, Safety Yellow, or combinations of these are colors to identify traffic and housekeeping markings.

The use of all these safety colors is not required by law, but is considered a good idea for safety.

ACTIVITY 1:

Match the safety colors on the left with their meaning on the right.

___ 1.	Green.	a.	Dangerous parts of machinery or energized equipment.
___ 2.	Blue.	b.	Safety and location of first aid equipment.
___ 3.	Red.	c.	Caution.
___ 4.	Black, white, yellow.	d.	Formerly used for radiation hazard.
___ 5.	Black on yellow.	e.	Radiation hazard.
___ 6.	Orange.	f.	Fire protection equipment, danger, stop.
___ 7.	Yellow.	g.	Traffic and housekeeping markings.
___ 8.	Purple.	h.	Informational signs.

OBJECTIVE 2: Describe the purpose, colors used, and any other specific requirements for the following accident prevention signs:

a.	Danger.	f.	Slow moving vehicle.
b.	Caution.	g.	Biological hazard.
c.	Exit.	h.	Radiation hazard.
d.	Safety instructional.	i.	Chemical hazard.
e.	Directional.		

Accident prevention signs follow standards set by ANSI (Z35.1-1972). The purpose, recommended color, and design are given with examples of each type of sign.

Answers to Activities appear on page 20.

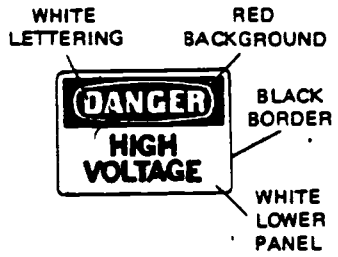


Figure 1. Typical danger sign.

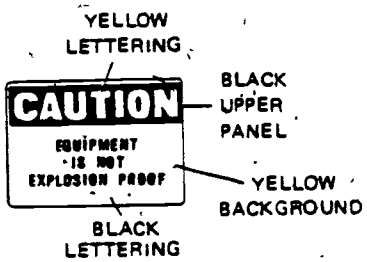


Figure 2. Typical caution sign.

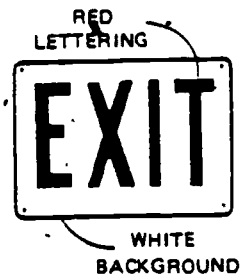


Figure 3. Typical exit sign.

Danger signs (Figure 1) are used to show that an immediate or grave hazard exists. They must have red as the main color for the upper panel, a black outline on the borders, and a white lower panel for extra sign wording. The Occupational Safety and Health Administration (OSHA) requires all workers to be taught that danger signs mean immediate danger and that special precautions are necessary.

Caution signs (Figure 2) are used to warn about possible hazards or to caution against unsafe practices. They must have yellow as the main color, with a black upper panel and black borders. The word caution is printed on the black panel in yellow lettering, and the lower yellow panel is used for extra sign wording. Black lettering must be used for extra wording in the lower panel. OSHA requires that all workers be taught that caution signs point out a possible hazard and proper precautions should be taken.

Exit signs (Figure 3) are used to indicate or mark doors or openings that lead out of a room, a structure or an area. These signs must be lettered in clear red letters not less than 6" high, on a white background, and the stroke of the letters must be at least 3/4" in width. Any door, passage, or stairway that is not an exit, nor a way to an exit, and that could be mistaken for an exit, must have a sign reading "Not an Exit," or something similar showing what it is (such as

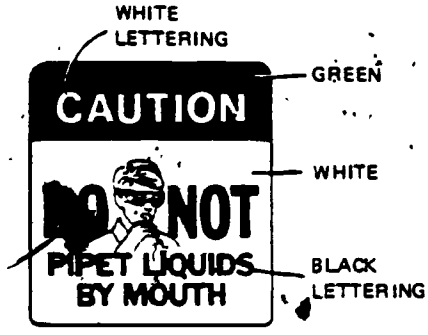


Figure 4. Typical safety instructional sign.

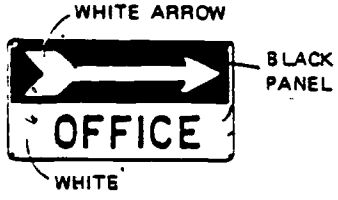


Figure 5. Typical directional sign.

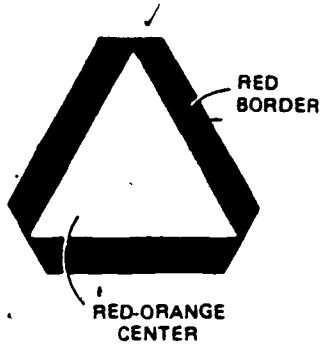


Figure 6. Typical slow-moving vehicle emblem (design).

"To Basement," "Storeroom," "Linen Closet)." "Not an Exit" signs are usually white with red lettering, and must be large enough to be easily read.

A sign reading "Exit," or words similar, with an arrow showing the direction, must be shown any place where the way to reach the nearest exit is not immediately obvious.

Safety instructional signs (Figure 4) are used when there is a need for general instructions and suggestions about safety measures. They must be white with a green upper panel and white letters that convey the main message. Any extra wording on the sign must have black letters on the white background in the lower panel.

Signs using an arrow (Figure 5) show the location of important safety items, the correct route to a certain area, or the path to take for safe evacuation. They are white with a black panel. A white arrow is on the black panel.

Slow-moving vehicle signs (Figure 6) are required by the Federal Department of Transportation (DOT) to mark vehicles traveling at 25 mph or less. The signs must be triangular with a dark red border that reflects light. The center must be fluorescent (day-glow) yellow-orange.

Biological hazard warning signs (Figure 7) show a real or possible health hazard such as an infectious agent. These signs use the symbol shown in Figure 7. The symbol and

wording must be orange, on a contrasting background (usually black).

Radiation hazard signs (Figure 8) are used to show that a radiation hazard exists. They apply to types of radiation such as X-rays, alpha, beta,

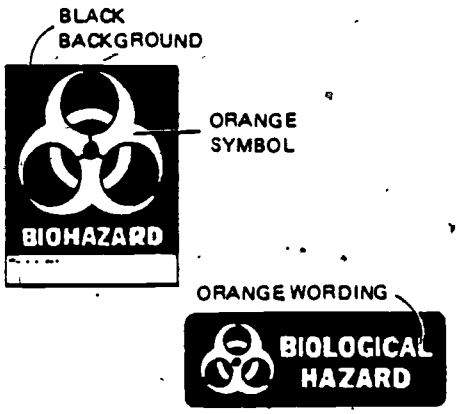


Figure 7. Typical biological hazard signs.

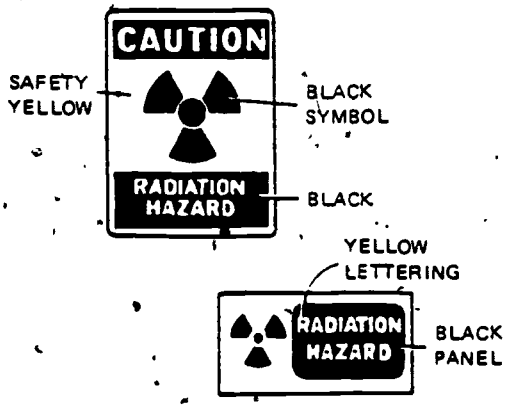


Figure 8. Typical radiation hazard signs.

gamma, neutron, proton, deutron, and meson rays. The American National Standards Institute set up black on safety yellow as the new colors for radiation hazard symbols in ANSI Z53.1-1979. By June 28, 1986, the change from the old colors (safety purple on safety yellow or safety black on safety white) must be made.

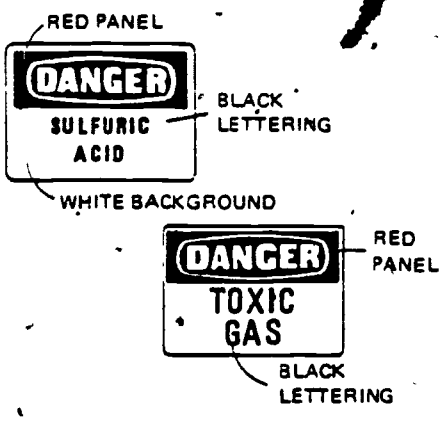


Figure 9. Typical chemical hazard signs.

Chemical hazard signs (Figure 9) are used to show immediate or grave hazards from toxic (poisonous) chemicals. These signs use red for the upper panel and black lettering for specific messages. Black and yellow caution signs warn against possible hazards from chemicals and dangerous substances.

Traffic signs (Figures 10-13), whether used on public highways or within a plant, must have certain colors, finish, shape, and design. Standards for these signs are set out in the Federal Manual on Uniform Traffic Control Devices.

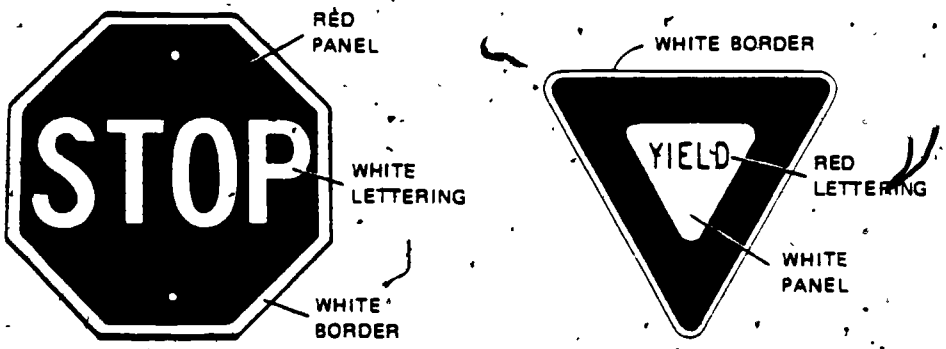


Figure 10. Typical stop and yield signs.

Any special state requirements must also be followed. There are thousands of types of traffic signs used for many purposes. The examples that follow are a few of the more usual traffic signs in use.

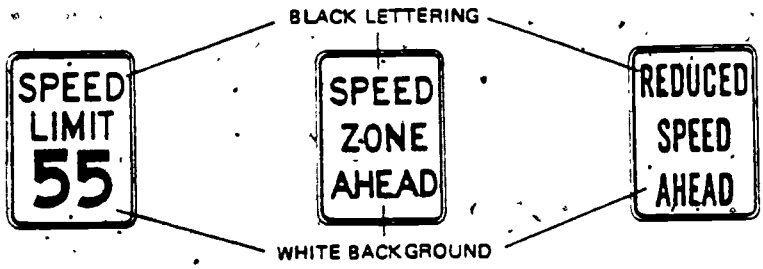


Figure 11. Typical speed signs.

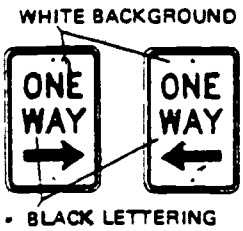


Figure 12. Typical one way signs.

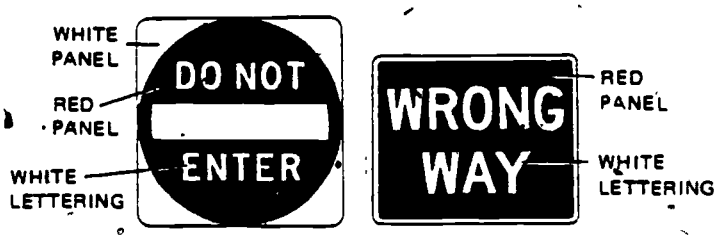


Figure 13. Typical wrong way and do not enter signs.

ACTIVITY 2:

Define the purpose of the following accident prevention signs:

1. Danger signs _____

2. Safety instructional signs _____

3. Caution signs _____

4. Slow-moving vehicle _____

OBJECTIVE 3: Briefly describe accident prevention tags and how they are used.

Accident prevention tags differ from signs since they are used as a temporary means of warning of hazards such as equipment or tools that are not working properly (Figure 14). Tags may not be used in place of accident prevention signs.

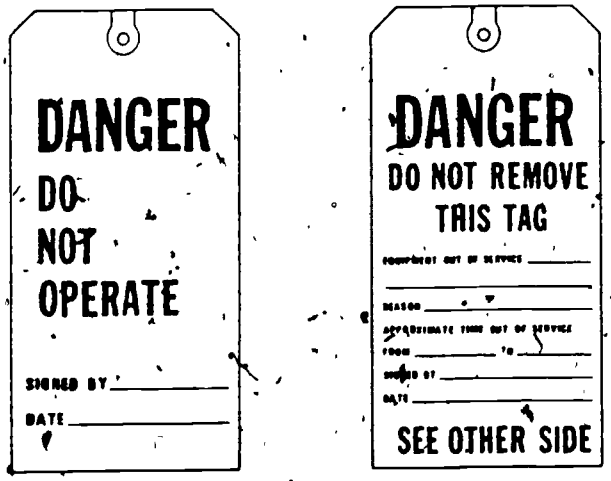


Figure 14. Front and back views of typical tag used when equipment is taken out of service because it has become unsafe.

Each workplace should set up a good system for taking out of use any equipment and materials that are unsafe. Special danger tags should be used to mark tools and materials that have become unsafe through wear, abuse, or defects. Before anyone works on electrical equipment, the main switch should be tagged as well as "locked out." "Locked out means switched off and locked with a special key, so that no one can turn it on by accident.)

When danger tags are used, there should always be a place for the signature of the inspector who is authorized to condemn equipment. Only the inspector who places the tag should be permitted to remove it and then only when he or she is satisfied that the hazardous condition has been removed.

No equipment or materials should be placed out of service without informing the person in charge of the department that is affected. A shutdown to avoid what might seem to be a possible hazard might interrupt work at great cost without actually affording any protection. The authority to condemn equipment should be exercised with great care by the inspector.

ACTIVITY 3:

How are accident prevention tags different from signs?

OBJECTIVE 4: Identify the color, use, and specifications of the following accident prevention tags:

a. Danger.
b. Caution.
c. Out of Order (Do Not Use).
d. Do Not Operate.

The drawing in Figure 15 shows the preferred accident prevention tags, although similar tags are acceptable. The standards regarding color, shape,

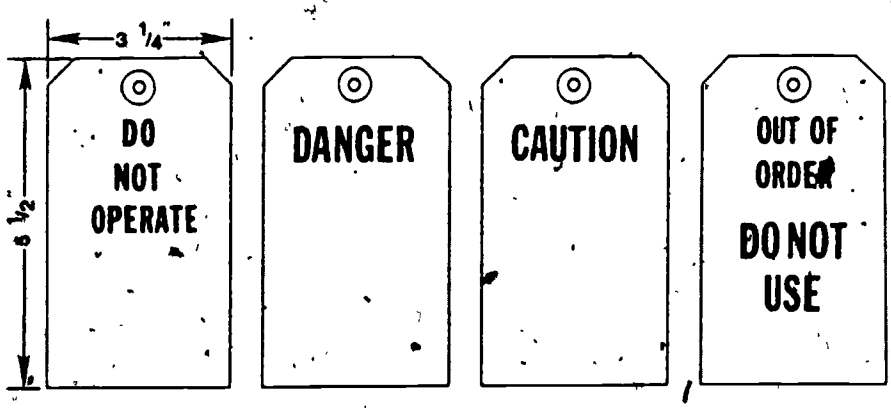


Figure 15. Preferred types and sizes of accident prevention tags.

size, wording, and design for accident prevention tags have been developed by ANSI and are required for industrial use by the Occupational Safety and Health Act of 1970 (OSHAct).

Accident prevention tags must not be used instead of signs. They should be used only for a temporary warning of hazards. Tags are divided into four general types of use: Danger (Figure 16), Caution (Figure 17), Do Not Operate

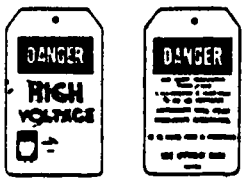


Figure 16. Typical danger tags.

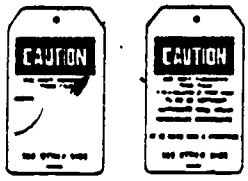


Figure 17. Typical caution tags.

(Figure 18), and Out of Order (Figure 19). Each tag may be used for a variety of instructions or legends. Shown are some examples of accident prevention tags and, in Table 2, legends that are used on them.

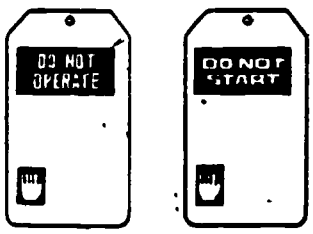


Figure 18. Typical do not operate tags.

Figure 19. Typical out of order tags.

TABLE 2. LEGENDS USED ON ACCIDENT PREVENTION TAGS.

Legend/Front Side	Legend/Front Side
Acid Blank Current On Do Not Close This Valve Do Not Drink This Water Do Not Open This Valve Do Not Operate Do Not Operate or Remove This Tag. To Do So Without Authority Will Mean Immediate Discharge. Do Not Operate Electrical Department Do Not Operate Electricians At Work Do Not Start This Machine Do Not Start This Motor Do Not Touch This Switch Do Not Throw Switch Men At Work On Circuit	FLAMMABLE MATERIAL Goggles...Must Be Worn When Operating This Equipment Hands Off. Do Not Operate Until This Tag is Removed by High Voltage Keep Out Live Wire Man in Boiler Blow-Off On Live Boiler Must Not Be Opened While This Tag Is Displayed Men Working In Chute Men Working In Boiler Men Working On Machinery Hands Off This Equipment No Smoking Matches Or Open Lights
Legend	**Legend**
Keep Off Stop Machinery To Clean To Oil To Repair Unsafe. Do Not Use	Blank Do Not Operate This Equipment. Do Not Operate This Switch Do Not Start This Machine Hands Off. Do Not Operate

ACTIVITY 4:

What are the four main categories of accident prevention tags?

1. _____
2. _____
3. _____
4. _____

OBJECTIVE 5: Sum up the requirements for labels, markings, and signs that apply to hazardous substances.

The wide use of hazardous substances (materials) presents a major problem to anyone responsible for having a safe, healthful workplace. Getting a job done without hazard to workers or property depends on the proper choice,

use, handling, and control of hazardous substances and an understanding of what they are like. A good working knowledge of the physical properties, the names, and the effects of exposure to hazardous substances is very helpful in deciding when a situation is unsafe.

Names can often be misleading. For example, benzine and benzene are different solvents which have very different toxic effects. Some commerical grades of benzine may have benzene in them. It is a good idea to check the label, or contact the manufacturer to find out the specific name and composition of the substance involved. Only after checking the name and composition should you try to work out the possible effect or hazard of a substance.

Labeling solvents and chemicals to show their properties and health and fire hazards is a very important method of recognizing and evaluating the hazards. The National Fire Protection Association has a system for marking containers of dangerous materials for in-plant use (NFPA Standard No. 704M). Numbers and background colors tell you immediately how severe the hazards are. Hazard Systems Labels are in blue, red, and yellow to represent health, flammability (how easily they can catch on fire), and reactivity (what they react to). Numbers ranging from 0 to 4 are marked on their special colored square to show how dangerous they are.

So that people can understand and use labels easily, the Manufacturing Chemists' Association Guide to Precautionary Labeling of Hazardous Chemicals, Manual L-1, recommends the following be put on labels:

1. Name of product.
2. Signal word telling degree of hazard – DANGER! WARNING! or CAUTION! POISON and the skull-and-crossbones should be used for chemicals defined as poisons or required by law to be labeled as such. POISON should be used as well as the other signal words.
3. Statement of hazards (EXTREMELY HAZARDOUS, FLAMMABLE).
4. Precautionary measures to be taken or action to be avoided (avoid breathing vapor, keep away from heat or open flame).
5. Instructions in case of contact or exposure (flush eyes or skin with plenty of water for at least 15 minutes).

Figure 20 shows a typical warning label with parts identified.

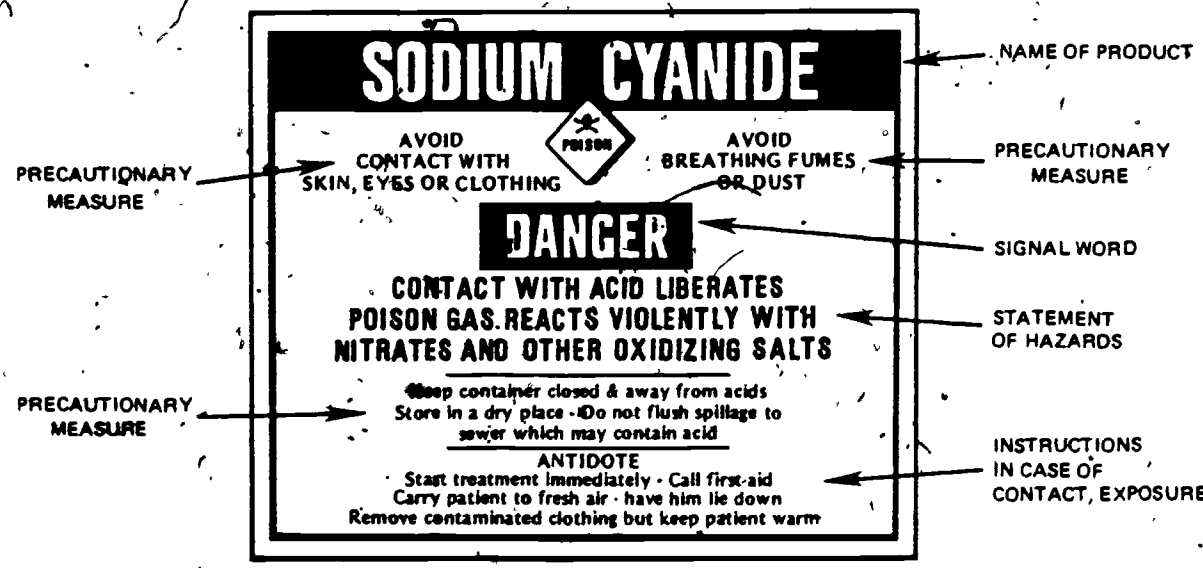


Figure 20. Typical hazardous chemical label.

Not only must hazardous substances be labeled, but also the vehicles used to transport them. Federal regulations state that the contents of vehicles carrying hazardous materials MUST be marked with placard (signs) as in Figure 21. Since the contents of the vehicles are changeable, the placards must also be able to be changed.

Figure 21. Typical hazardous material placard used on commercial vehicles.

Figure 22 shows examples of various hazardous examples of various hazardous substance signs and labels. The Department of Transportation requires shippers of hazardous materials to attached the proper label to each package. More than one label must be shown if the material has more than one hazard, or if two or more materials of different types are packed together.

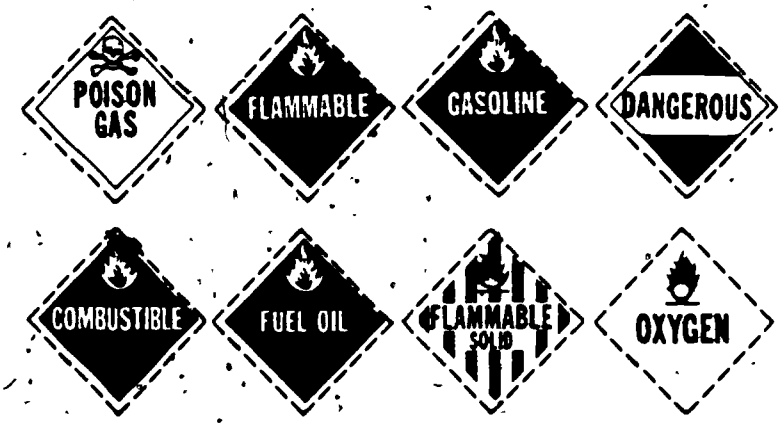


Figure 22. Typical hazardous substance signs and labels used for transportation and shipping purposes.

Radioactive materials must be labeled on two opposite sides of the package. Exporters who ship by air or water to foreign places may have their goods rejected if they have warning labels other than those shown. These labels all follow United Nations guidelines and must be used in the export shipment of hazardous materials.

The labels must be 10 cm x 10 cm (4" x 4") and be made of all-weather material.

ACTIVITY 5:

What five items of information does the Manufacturing Chemists' Association recommend for a hazardous chemical label?

1. _____
2. _____
3. _____
4. _____
5. _____

OBJECTIVE 6: Describe the requirements for signs, markings, or labels for the following:

1. Compressed gas cylinders.
2. Fire extinguishers.
3. Liquefied petroleum gases.
4. Load ratings (cranes, derricks, and powered industrial trucks).
5. Aisle and floor load markings.

There are many specific uses of accident prevention signs, labels, and markings and the OSHAct sets out guidelines for them. The following are descriptions and sample markings for a few of them.

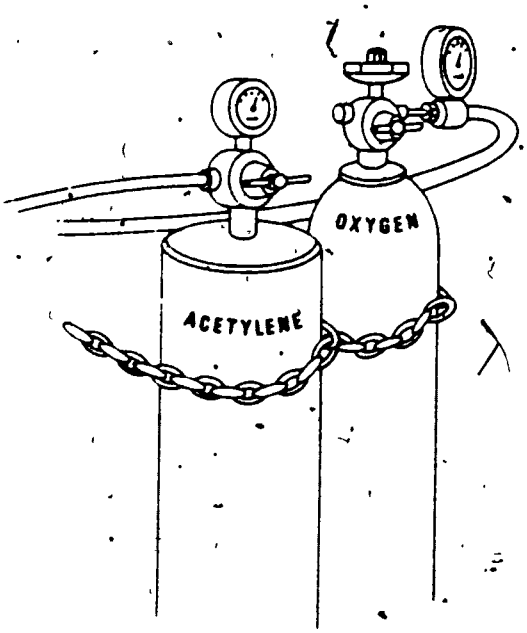


Figure 23. Compressed gas cylinders.

Compressed gas cylinders should be clearly marked, for the purpose of naming the gas content, with either the chemical or trade name of the gas. Such marking should not be readily removable. Whenever possible, the marking should be located on the shoulder of the cylinder (see Figure 23) to conform to ANSI Z48.1-1954.

Fire extinguishers must not be blocked from view. In large rooms, and in certain places where an extinguisher cannot be easily seen, a sign must clearly show where the extinguisher is and when to use it. (Figures 24 and 25.)

If extinguishers for different classes of fires are located in groups, the specific use of each extinguisher must be marked to stand out clearly so that the proper extinguisher will be chosen at the time of a fire.

Liquefied petroleum storage areas must have "NO SMOKING" signs present on the storage tanks. (See Figure 26.) Signs should be posted to stand out

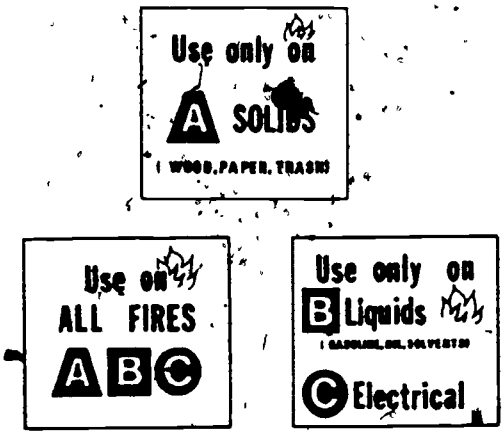


Figure 24. Intended use of extinguishers.

Figure 25. Location of extinguishers.

clearly, reading "Danger — No Smoking, Matches, Open Lights," or other like wording.

Figure 26. "No smoking" sign is required for liquefied petroleum storage tanks.

Safety signs are also required on cranes and derricks. The proper load of cranes should be plainly marked (Figure 27) on each side of the crane, and if the crane has more than one hoisting unit, each hoist should have its load marked on the hoist or the load block. This marking must be clearly readable from the ground or floor. A rating chart with clearly readable letters and

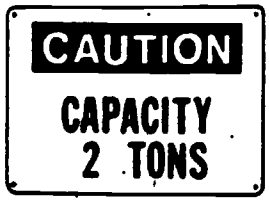


Figure 27. Rated load of cranes should be marked on each side of crane.

figures must come with each crane. The chart must be firmly fixed to the crane cab in a place able to be seen easily by the operator while he or she is seated at the control station.

Charts are also required for permanently installed derricks. The charts should show load ratings and similar data to help operate the crane or derrick safely.

Fork trucks, tractors, and other industrial power vehicles should have a label or mark showing approval by a known testing laboratory. Changes and additions that alter how much such vehicles can carry, or how safe they are, should not be made without first getting written approval from the maker. When they are changed, the tags, decals, or signs showing how to use the vehicle, what load it can carry, and how to service it must be changed. Anyone using such equipment should make sure the markings are kept in place and are readable.

Where mechanical handling equipment is used, safe clearances must be left for aisles, at loading docks, through dockways and wherever turns or, passage must be made. Aisles and passageways should be kept clear of obstructions and in good repair. Permanent aisles should be marked with a sign. (See Figure 28.)

Figure 28. Aisle marker.

Any place used for trade, manufacture, or storage must have a plate attached to the building showing floor and roof loads approved by a building official. These must be clearly shown at all times. It is illegal to place a load greater than that shown on the plate on any floor or roof.

ACTIVITY 6:

(Fill in the blanks):

1. Fire extinguishers should be marked to show _____.
2. Liquefied petroleum storage areas must have _____ signs present on the storage tanks.

3. Cranes, derricks, and powered industrial trucks must be marked with _____.

This module has discussed the colors, designs, and uses of safety signs, labels, and tags. Since quick recognition of such safety devices could save lives or prevent injuries, all workers (or future workers) are urged to become familiar with them.

REFERENCES

American National Standards Institute. American National Standard Safety Color Code for Marking Physical Hazards. ANSI Z53.1-1979. New York: American National Standards Institute, 1979.

_____. American National Standard Specifications for Accident Prevention Signs. ANSI Z35-1972. New York: American National Standards Institute, 1972.

_____. Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained. ANSI Z48.1-1954. New York: American National Standards Insitute, 1954.

Lab Safety Supply Co. Safe Handling of Toxic and Hazardous Chemicals and Biologicals, Product Catalogue. Janesville, WI: 1981.

National Safety Council. Accident Prevention Manual for Industrial Operations. Chicago: The National Safety Council, 1979.

SA-SO, Sargent-Sowell, Inc. General Catalogue No. 163. Grand Prairie, TX: Sargent-Sowell, Inc., 1981.

U.S. Department of Labor. Construction Safety and Health Regulations. Part 1926. Washington, DC: The United States Government Printing Office, 1974.

_____. General Industry Safety and Health Standards. Part 1910. Washington, DC: The United States Government Printing Office, 1976.

_____. Occupational Safety and Health Standards for General Industry. (29 CFR Part 1910). Chicago: Commerce Clearing House, 1979.

ANSWERS TO ACTIVITIES

ACTIVITY 1

1. b.
2. h.
3. f.
4. g.
5. e.
6. a.
7. c.
8. d.

ACTIVITY 2

1. Danger signs — indicate that an immediate or grave hazard exists.
2. Safety instructional signs — used when there is a need for general instructions and suggestions about safety measures.
3. Caution signs — used to warn against possible hazards or to caution against unsafe practices.
4. Slow moving vehicle — used to identify vehicles traveling at 25 miles per hour or less.

ACTIVITY 3

Tags are used as a temporary means of warning persons of hazards.

ACTIVITY 4

1. Do Not Operatre.
2. Danger.
3. Caution.
4. Out of Order (Do Not Use).

ACTIVITY 5

1. Name of product.
2. Signal word (Danger, Warning, Caution).
3. State of hazards.
4. Precautionary measures.
5. Instructions in case of contact, exposure, etc.

ACTIVITY 6

1. Use, intended use, or proper use (any one).
2. NO SMOKING.
3. Load ratings.